

Q1 removing the oxidation resistance film above the second formation area; and
forming a second oxide film on the second formation area, wherein the first oxide film
has thickness different from the second oxide film.

2. A semiconductor device manufacturing method according to claim 1,
wherein the first oxide film serves as a gate oxide film of a first transistor, and the second oxide film
serves as a gate oxide films of a second transistor.

3. A semiconductor device manufacturing method according to claim 2,
wherein the first transistor is formed on the first oxide film, and the second transistor is formed on
the second oxide film,
wherein the first oxide film is formed by performing thermal oxidization by using the oxidation
resistant film as a mask,
wherein the second oxide film is formed by performing thermal oxidization.

B1
cont.
Q2 4. (Amended) A semiconductor device manufacturing method comprising:
forming a device separation film on the semiconductor;
forming an oxide film on a first transistor formation area and a second transistor
formation area by performing thermal oxidization using the device separation film as a mask;
forming an oxidation resistant film across the entire surface of the semiconductor;
removing the oxidation resistant film on the first transistor formation area by using a
photoresist film as a mask;
removing the photoresist film;
removing the oxide film on the first transistor formation area by using the oxidation
resistant film on the second transistor formation area as a mask;
forming a first oxide film by performing thermal oxidization by using the oxidation
resistant film formed on the second transistor formation area as a mask;
removing the oxidation resistant film and the oxide film on the second transistor
formation area;

02 forming a second oxide film on the second transistor formation area by performing thermal oxidization, wherein the first oxide film has thickness different from the second oxide film.

5. A semiconductor device manufacturing method according to claim 4, wherein a high-voltage MOS transistor is formed on the first gate oxide film thicker than the second gate oxide film, wherein a normal-voltage MOS transistor is formed on the second gate oxide film.

6. A semiconductor device manufacturing method according to claim 4, wherein the surface of the semiconductor is not exposed when the photoresist film is used as a mask.

03 7. (Amended) A semiconductor device manufacturing method according to claim 4, wherein forming a first transistor includes:

forming a source/drain layer of a first conductive type having a low concentration by implanting ions of a first conductive impurity into the semiconductor of a second conductive type;

forming a source/drain layer of the first conductive type having a high concentration in the source/drain layer having the low concentration by implanting ions of the first conductive impurity into the semiconductor;

forming a semiconductor layer of the second conductive type that serves as a channel and is located between the source/drain layers of the first conductive type; and

forming a first gate electrode on the semiconductor through the first gate oxide film.

8. (Amended) A semiconductor device manufacturing method according to claim 7, wherein the source/drain layer having the low concentration is formed to contact at least the semiconductor layer that is formed below the first gate electrode.

9. (Amended) A semiconductor device manufacturing method according to claim 7,

wherein the source/drain layer having the low concentration extends in a surface layer of the semiconductor to contact at least the semiconductor layer that is formed below the first gate electrode.

10. (Amended) A semiconductor device manufacturing method according to claim 4 further comprising forming a first transistor after forming the first gate oxide film, including:
forming an opposite conductive source/drain layer having a low concentration by implanting ions of an opposite conductive impurity into the semiconductor of one conductive type;

forming an opposite conductive source/drain layer having a high concentration in the opposite conductive source/drain layer having the low concentration by implanting ions of the opposite conductive impurity into the semiconductor; and

forming a first gate electrode on the semiconductor through the first gate oxide film.

11. (Amended) A semiconductor device manufacturing method comprising:
forming a device separation film on the semiconductor;
forming an oxide film on a first transistor formation area and a second transistor formation area by performing thermal oxidization using the device separation film as a mask;
forming an oxidation resistant film across the entire surface of the semiconductor;
removing the oxidation resistant film on the first transistor formation area by using a photoresist film as a mask;
removing the photoresist film;
removing the oxide film on the first transistor formation area by using the oxidation resistant film on the second transistor formation area as a mask;
forming a first oxide film by performing thermal oxidization by using the oxidation resistant film formed on the second transistor formation area as a mask;
removing the oxidation resistant film and the oxide film on the second transistor formation area;

forming a second oxide film on the second transistor formation area by performing thermal oxidization, wherein the first oxide film has thickness different from the second oxide film; and further comprising:

forming the first transistor after forming the first gate oxide film, which includes

forming first impurity layers having a low concentration by implanting ions of a first conductive impurity into two portions of the semiconductor of a second conductive type;

forming a second impurity layer having a low concentration by implanting ions of the first conductive impurity to connect the first impurity layers;

forming a third impurity layer having a high concentration by implanting ions of the first conductive impurity in the first impurity layer;

forming a fourth impurity layer by implanting ions of a second conductive impurity to divide the second impurity layer; and

forming a first gate electrode on the semiconductor including the fourth impurity layer through the first gate oxide film.

12. A semiconductor manufacturing method according to claim 11,
wherein the second impurity layer is thinner than the first impurity layer. --

In the abstract:

Please replace the abstract with the following version.

-- A substrate is provided having first and second formation areas. An oxide film is formed on both formation areas. An oxidation resistance film is then formed on the oxide film. The second formation area is masked by disposing a photoresist on the oxidation resistance film above the second formation area. The oxidation resistant film is removed from the first formation area and then the photoresist above the second formation area is removed. The oxide film above the first formation area is removed while using the oxidation resistant film above the second formation area as a mask. A first oxide film is formed on the first formation area followed by the removal of the oxidation resistance film above the second formation area.

Applicant : Toshimitsu Taniguchi, et al.
Serial No. : 09/891,580
Filed : June 26, 2001
Page : 6

Attorney's Docket No.: 10417-085001 / F51-
134750M/TOM

ay Subsequently, a second oxide film is formed on the second formation area. The first oxide film is designed to have thickness different from the second oxide film.--
